

**FINANCIAL ASSISTANCE  
FUNDING OPPORTUNITY ANNOUNCEMENT**



**U.S. Department of Energy**

**Commercial Demonstration of an Integrated Biorefinery  
System for Production of Liquid Transportation Biofuels,  
Biobased Chemicals, Substitutes for Petroleum-based  
Feedstocks and Products, and Biomass-based Heat/Power**

**Funding Opportunity Number: DE-PS36-06GO96016**

**Announcement Type: Modification 003**

**CFDA Number: 81.087 Renewable Energy Research and Development**

**Issue Date: 02/22/2006**

**Letter of Intent Due Date: 03/30/2006**

**Pre-Application Due Date: Not Applicable**

**Application Due Date: 08/10/2006 at 11:59 PM Eastern Time**

DE-PS36-06GO96016  
Amendment No. 001  
Page 1 of 2

DATE: April 10, 2006

FROM: James P. Damm, Contracting Officer

TO: All Prospective Applicants

SUBJECT: Amendment No. 001 to Announcement No. DE-PS36-06GO96016,  
Commercial Demonstration of an Integrated Biorefinery System for Production of  
Liquid Transportation Biofuels, Biobased Chemicals, Substitutes for Petroleum-  
based Feedstocks and Products, and Biomass-based Heat/Power

The Announcement is amended as follows:

1. **Part II. B. ESTIMATED FUNDING** is deleted and changed to read **Part II. B. ANTICIPATED FUNDING**. In addition, under **Part II. B. ANTICIPATED FUNDING**, the statement, “Approximately \$53,000,000 is expected to be available in FY07 for new awards under this announcement” is deleted in its entirety and replaced with the statement, “Approximately \$53,000,000 is expected to be available in FY07 for new awards under this announcement, subject to the availability of appropriated funds in FY07. Funding in Fiscal Years 08 and 09 will be subject to the availability of appropriated funds in each of those fiscal years.”
2. Under **Part II. C. MAXIMUM AND MINIMUM FEDERAL AWARD SIZE**, both the Ceiling and Floor are amended to include the addition of “subject to the availability of appropriated funds” and changed to read:
  - Ceiling (i.e., the maximum amount of an individual award made under this announcement): \$80,000,000 of Federal Support, subject to the availability of appropriated funds.
  - Floor (i.e., the minimum amount of an individual award made under this announcement): \$50,000,000 of Federal Support, subject to the availability of appropriated funds.
3. Under **Part II. D. EXPECTED NUMBER OF AWARDS**, the statement, “DOE anticipates making up to three awards under this announcement depending on the size of the awards” is amended to include the addition of “the availability of appropriated funds” and changed to read, “DOE anticipates making up to three awards under this announcement depending on the size of the awards and the availability of appropriated funds.”

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4. Under **Part II. E. PERIOD OF PERFORMANCE**, the statement, “DOE will support projects at award levels up to \$20,000,000 per year for up to four (4) years” is amended to include the addition of “subject to the availability of appropriated funds” and changed to read, “DOE will support projects at award levels up to \$20,000,000 per year for up to four (4) years, subject to the availability of appropriated funds.”

All other parts of the Announcement remain unchanged.

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Amendment No. 002  
Page 1 of 2

DATE: April 12, 2006

FROM: James P. Damm, Contracting Officer

TO: All Prospective Applicants

SUBJECT: Amendment No. 002 to Announcement No. DE-PS36-06GO96016,  
Commercial Demonstration of an Integrated Biorefinery System for Production of  
Liquid Transportation Biofuels, Biobased Chemicals, Substitutes for Petroleum-  
based Feedstocks and Products, and Biomass-based Heat/Power

The Announcement is amended as follows:

1. Under **Part V. A. 1. Initial Review Criteria**, the following paragraphs are added:

- **Requirement for 700 dry metric tonnes per day of feedstock.**

Any proposed biorefinery operation should be designed, engineered, and constructed to operate at a minimum capacity of 700 dry metric tonnes of feedstock per day. It is expected that the throughput for the facility will remain fairly constant throughout the year, realizing that down time for maintenance and servicing is a component of any operating facility and that costs for loss of productivity are factored into the overall economics of the facility. The required throughput for the facility is based on 700 dry metric tonnes per day for 330 operating days per year, giving an annual throughput of 231,000 dry metric tones. The requirement that the biorefinery must operate profitably without direct Federal subsidy after initial construction costs are paid applies to long-term, multi-year operations that include down time, as well as periods of high throughput.

- **Requirement on feedstocks.**

The definitions found in Section 932(a) of EPAAct 2005 provide specific guidance on suitable feedstocks for the Integrated Biorefinery Demonstration Projects, 932(d). In addition, DOE has determined that the following is consistent with the guidance in Section 932:

- a. No plant based oils that are generally intended for use as food can be employed as a feedstock. Hence, soy, canola, sunflower, peanut, etc. oils are excluded. The determining factor is the typical use of the oil in commerce. Use of excess oil production of a food grade oil does not constitute an eligible feedstock either.
- b. No food, including DDGS intended for animals, qualifies for a feedstock; only waste materials as defined in Section 932(a)(1-2).
- c. Municipal Solid Waste (MSW) is also not an eligible feedstock. However, biomass as defined in Section 932(a)(1-2) that is segregated from the MSW as a separate stream, could be employed as a feedstock

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with appropriate considerations for the costs of such segregation, collection, processing, and transportation. Hence, post-sorted MSW, where all recyclables and non-biomass components have been removed, would qualify, but only the remaining dry lignocellulosic stream qualifies as a feedstock for purposes of this FOA. Assuming such feedstocks are obtained at no cost is not a realistic scenario.

2. Under **Part V. A. 2. Merit Review Criteria**, paragraph three, the statement, “The oral presentation, if determined necessary, will consist of two parts – the oral presentation (up to one hour) by up to five of the highest ranked applicants...” is deleted and changed to read, “The oral presentation, if determined necessary, will consist of two parts – the oral presentation (up to one hour) by up to six of the highest ranked applicants...”
3. Under **Part V. A. 2. Merit Review Criteria**, paragraph six, the statement, “A program policy factor review will be conducted by DOE personnel within the Biomass Program following the merit review process” is deleted and changed to read, “The Selection Official may employ program policy factors for applications forwarded to the Selection Official, and DOE personnel within the Biomass program will serve as policy advisors in applying these factors to the selection.”
4. Under **Part VI. B. 2. Special Terms and Conditions and National Policy Requirements**, the following paragraph is added:

**Validation of Criteria.**

As a programmatic necessity, DOE requires information on the financial viability of the commercialization of the technologies developed under this FOA effort.

Therefore, an awardee must be willing to provide DOE with sufficient financial and project information to validate that the facility constructed will operate profitably according to the standards set in law (Section 932 of EPCA 2005). Such information would likely be provided to Congress and perhaps even publicly. No proprietary technical data would be requested for this purpose. These data would be comprised of operational information that would be adequate to update a business, market, and deployment plan such as that asked for in Appendix C, Criterion 1, “Feasibility: Business and Market Plans” and Criterion 2, item A, “Deployment Plan.” Another example of data and format that would be acceptable, if an applicant has access to this reference material, would be similar to that found in the Stanford Research Institute’s PEP International Yearbooks. However, the main information needed is that which allows DOE to validate the claims for profitable operation.

All other parts of the Announcement remain unchanged.

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Amendment No. 003  
Page 1 of 2

DATE: July 27, 2006

FROM: James P. Damm, Contracting Officer

TO: All Prospective Applicants

SUBJECT: Amendment No. 003 to Announcement No. DE-PS36-06GO96016,  
Commercial Demonstration of an Integrated Biorefinery System for Production of  
Liquid Transportation Biofuels, Biobased Chemicals, Substitutes for Petroleum-  
based Feedstocks and Products, and Biomass-based Heat/Power

The Announcement is amended as follows:

1. Under **Appendix C – Format and Instructions for the Project Narrative**, the following paragraph is added and becomes paragraph two:

This Appendix is a compilation of key items DOE considers important in assessing the ability of an applicant to meet the two criteria – profitability and replicability. It is intended to assist applicants in developing their project narrative. Depending on the project, it may be appropriate to add information not asked for in this Appendix or supplant certain areas with other information that better addresses the criteria. For example, the use of no-cost feedstocks is considered unrealistic (see Amendment 002). However, if an applicant can demonstrate that it can obtain a no-cost feedstock, with a long-term commitment by a supplier, and that it can replicate this operation in multiple places across the country, this economic factor may weigh positively into the quality of the application. Thus, the ability to employ use of no-cost feedstock as a means of operating profitably must be documented and sufficient information provided that can be validated rather than simply stated. The intent of asking applicants to follow this Appendix when crafting the narrative is to demonstrate that the proposed project will meet the two criteria in the best possible way. Anything less is inadequate.

2. Under **Appendix C Criterion 1. C. 2. Waste streams and emissions**, the following paragraphs are added:

Clarification regarding the use of the estimators provided by the Industrial Technologies program to quantify reduction in waste emissions at [http://www.energetics.com/ies\\_tool](http://www.energetics.com/ies_tool):

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The basis for the information required in this section is to show that an applicant demonstrably exhibits an understanding of the waste streams and emissions resulting from its operation as an overall technical and economic component of operating costs. This has direct bearing on meeting merit review criterion one. Thus, an applicant needs to show how the management of these waste streams and emissions affects the bottom line on operating the plant. The tool referenced here is offered as a means of helping an applicant to estimate such streams and emissions from energy use in an operating plant. It may not completely accommodate all configurations. DOE expects use of the tool where it makes logical sense with augmentation by engineering analyses to accommodate the balance of the operation in estimating waste streams and emissions.

Energy efficiency savings through use of a lignocellulosic-based process is not being requested, rather how the applicant manages the waste streams and emissions from the energy sources employed. The energy savings related to oil displacement by production of a biofuel, biobased-product, petroleum-based feedstock, or heat and power is requested under Appendix C – Criterion 1. Oil displacement, not in this section.

All other parts of the Announcement remain unchanged.

## **NOTE: NEW REQUIREMENTS FOR GRANTS.GOV**

### **Where to Submit**

Applications must be submitted through Grants.gov to be considered for award.

### **Registration Requirements**

There are several one-time actions you must complete in order to submit an application through Grants.gov (e.g., obtain a Dun and Bradstreet Data Universal Numbering System (DUNS) number, register with the Central Contract Registry (CCR), register with the credential provider, and register with Grants.gov). See <http://www.grants.gov/GetStarted>. Use the Grants.gov Organization Registration Checklist at <http://www.grants.gov/assets/OrganizationRegCheck.doc> to guide you through the process. Designating an E-Business Point of Contact (EBiz POC) and obtaining a special password called an MPIN are important steps in the CCR registration process. Applicants, who are not registered with CCR and Grants.gov, should allow at **least 14 days** to complete these requirements. It is suggested that the process be started as soon as possible.

### **Questions**

Questions relating to the registration process, system requirements, how an application form works, or the submittal process must be directed to Grants.gov at 1-800-518-4726 or [support@grants.gov](mailto:support@grants.gov). Part VII of this announcement explains how to submit other questions to the Department of Energy (DOE).

### **Application Receipt Notices**

After an application is submitted, the Authorized Organization Representative (AOR) will receive a series of four e-mails. It is extremely important that the AOR watch for and save each of the emails. It may take up to two (2) business days from application submission to receipt of email Number 2. You will know that your application has reached DOE when the AOR receives email Number 4. You will need the Submission Receipt Number (email Number 1) to track a submission. The titles of the four e-mails are:

Number 1 - Grants.gov Submission Receipt Number

Number 2 - Grants.gov Submission Validation Receipt for Application Number

Number 3 - Grants.gov Grantor Agency Retrieval Receipt for Application Number

Number 4 - Grants.gov Agency Tracking Number Assignment for Application Number

After receipt of email Number 4, you can view your application at DOE's e-Center, <http://e-center.doe.gov>. A User Id and password are required. If you already have a User Id and password you do not need to re-register.

### **VERY IMPORTANT – Download PureEdge Viewer**

In order to download the application package, you will need to install PureEdge Viewer. This small, free program will allow you to access, complete, and submit applications electronically and securely. For a free version of the software, visit the following web site:

<http://www.grants.gov/DownloadViewer>.



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## **PART I – FUNDING OPPORTUNITY DESCRIPTION**

The Department of Energy (DOE), Office of Energy Efficiency and Renewable Energy (EERE) announces a funding opportunity for cooperative agreements from the Office of the Biomass Program. This Funding Opportunity Announcement (FOA) is being issued under authorization of the Energy Policy Act (EPAcT) of 2005, Section 932. Amendments to the Internal Revenue Code of 1986 within Title XIII, Energy Policy Tax Incentives cited in EPAcT and sections 1345 and 1346 (renewable fuel and biodiesel credits) of EPAcT provide additional impetus and credit enhancements for potential applicants to respond to this announcement.

The federal government, and particularly DOE, have been investing for several years in R&D to find alternative sources of petroleum-based feedstocks and to develop new sources of transportation fuels to reduce our dependence on imported oil. The operational vehicle that will most likely be the engine for achieving these two goals is the integrated biorefinery. Investment by private industry in such operations possesses very high risk factors. By undertaking cost-shared development and deployment activity, it is DOE's expectation that commercially viable operations can be shown to be economically viable and this would be an impetus for future investments in biofuels, bioproducts, and energy production. Hence, the success of these biorefineries would lead to the increased use of indigenous biomass resources to produce U.S.-based sources of transportation fuels, biobased products, replacements for petroleum-based feedstocks, and heat/power.

DOE has funded biorefinery technology development projects since FY 2002 to meet two of the EERE performance goals – dramatically reduce, or even end, dependence on imported oil and spur the creation of the domestic bioindustry. Those projects, as well as other efforts to develop technologies suitable for integrated biorefineries, are ending in about FY2007. The importance of providing continued support to the development of integrated biorefineries was evidenced when EPAcT 2005 was signed into law in August of 2005. Section 932 of EPAcT directs DOE to carry out a program to demonstrate the commercial application of integrated biorefineries. Additionally, EPAcT directs DOE to announce a funding opportunity for advanced biorefineries for the production of biofuels, bioproducts, substitutes for petroleum-based feedstocks and products, and biomass-based heat and power from lignocellulosics. The complete text of EPAcT 2005, Section 932, which includes a general description of a biorefinery, is provided in Appendix D.

This FOA requests applications to design, construct, build and operate an integrated biorefinery employing lignocellulosic feedstocks for the production of combinations of (i) liquid transportation fuels; (ii) biobased chemicals; (iii) substitutes for petroleum-based feedstocks and products; and (iv) energy in the form of electricity or useful heat. Per Section 932, the use of a wide variety of lignocellulosic feedstocks is encouraged as well as inclusion of technology to collect and treat this wide variety of biomass feedstocks. EPAcT also specifies that lignocellulosic feedstocks may include a wide range of possible materials, but not those biomass components specifically grown for food. Hence applications proposing biomass grown for food such as starch or protein, including animal food, would be considered non-compliant. Also, this FOA does not address item (e) within Section 932, the University Biodiesel Program. To support DOE's goals, it is expected that biorefineries proposed under this FOA will be operational within three to four years.

The intended outcomes of these cooperative agreements, as spelled out in Section 932, are as follows:

- Once the advanced biorefinery is operational and the initial construction loans are paid, the biorefinery should be operating profitably without federal subsidy (renewable fuel credits are not a subsidy); and
- The biorefinery operation should be replicable. The issue of replicability is discussed in Part V.A.2 – Merit Review Criteria.

The thrust of FOA, DE-PS36-06GO96016, is demonstration and commercialization, rather than research and development. Minor R&D efforts to improve unit operations, integration, and analysis techniques would be acceptable.

## **PART II – AWARD INFORMATION**

### **A. TYPE OF AWARD INSTRUMENT.**

- DOE anticipates awarding cooperative agreements under this program announcement (See Section VI.B.2 Statement of Substantial Involvement).

### **B. ESTIMATED FUNDING.** Approximately \$53,000,000 is expected to be available in FY07 for new awards under this announcement.

### **C. MAXIMUM AND MINIMUM FEDERAL AWARD SIZE.**

- Ceiling (i.e., the maximum amount for an individual award made under this announcement):  
\$ 80,000,000 of Federal Support
- Floor (i.e., the minimum amount for an individual award made under this announcement):  
\$ 50,000,000 of Federal Support

### **D. EXPECTED NUMBER OF AWARDS.** DOE anticipates making up to three awards under this announcement depending on the size of the awards.

### **E. PERIOD OF PERFORMANCE.**

- DOE will support projects at award levels up to \$20,000,000 per year for up to four (4) years.

### **F. TYPE OF APPLICATION.**

- DOE will accept only new applications under this announcement.

### **PART III - ELIGIBILITY INFORMATION**

#### **A. ELIGIBLE APPLICANTS.**

- All types of domestic applicants are eligible to apply, except other Federal agencies, Federally Funded Research and Development Center (FFRDC) Contractors, and non-profit organizations described in section 501(c)(4) of the Internal Revenue Code of 1986 that engaged in lobbying activities after December 31, 1995.

#### **B. COST SHARING.**

- The cost share by an applicant must be at least 60% of the total allowable costs for demonstration and commercial application projects (i.e., the sum of the Government share, including FFRDC contractor costs if applicable, and the recipient share of allowable costs equals the total allowable cost of the project) and must come from non-Federal sources. (See 10 CFR part 600 for the applicable cost sharing requirements). This minimum cost-share ratio (60:40 non-federal vs federal) is based on the government's need to distribute risk among the various private sector developers/investors of potentially, commercially-viable biorefineries. This cost-share will also allow DOE more flexibility in leveraging available funds for such facilities.

#### **C. OTHER ELIGIBILITY REQUIREMENTS.**

- **Federally Funded Research and Development Center (FFRDC) Contractors**  
FFRDC applicants are not eligible for an award under this announcement, but they may be proposed as a team member subject to the following guidelines:

Authorization for DOE/NNSA FFRDCs. The cognizant contracting officer for the FFRDC must authorize in writing the use of a DOE/NNSA FFRDC contractor on the proposed project and this authorization must be submitted with the application. The following wording is acceptable for this authorization.

"Authorization is granted for the \_\_\_\_\_ Laboratory to participate in the proposed project. The work proposed for the laboratory is consistent with or complimentary to the missions of the laboratory, will not adversely impact execution of the DOE/NNSA assigned programs at the laboratory, and will not place the laboratory in direct competition with the domestic private sector."

Value/Funding. The value of, and funding for, the FFRDC contractor portion of the work will not normally be included in the award to a successful applicant. Usually, DOE/NNSA will fund a DOE/NNSA FFRDC contractor through the DOE field work proposal system and other FFRDC contractors through an interagency agreement with the sponsoring agency.

Cost Share. The applicant's cost share requirement will be based on the total cost of the project, including the applicant's and the FFRDC contractor's portions of the effort.

FFRDC Contractor Effort:

The FFRDC contractor effort, in aggregate, shall not exceed **2%** of the total estimated cost of the project, including the applicant's and the FFRDC contractor's portions of the effort.

Responsibility. The applicant, if successful, will be the responsible authority regarding the settlement and satisfaction of all contractual and administrative issues, including but not limited to, disputes and claims arising out of any agreement between the applicant and the FFRDC contractor.

- **Statutory Requirements and Office of Biomass Program Policy**

Applicants for this FOA must meet requirements for successful projects given in EPA Act 2005, Section 932 with respect to feedstocks, and must be in compliance with Office of Biomass Program Policy. Specific requirements are as follows:

- The mass of biomass feedstock throughput is at least 700 dry metric tonnes per day.
- Transportation biofuels, if produced, must be ethanol, biodiesel, or any fungible replacement for gasoline or diesel as a transportation fuel produced from lignocellulosics.

## **PART IV – APPLICATION AND SUBMISSION INFORMATION**

### **A. ADDRESS TO REQUEST APPLICATION PACKAGE.**

Application forms and instructions are available at Grants.gov. To access these materials, go to <http://www.grants.gov>, select “Apply for Grants,” and then select “Download Application Package.” Enter the CFDA and/or the funding opportunity number located on the cover of this announcement and then follow the prompts to download the application package. **NOTE:** You will not be able to download the Application Package unless you have installed PureEdge Viewer (See: <http://www.grants.gov/DownloadViewer>).

### **B. LETTER OF INTENT AND PRE-APPLICATION.**

#### **1. Letter of Intent.**

- Potential applicants are requested to submit, by March 30, 2006, a letter of intent describing their intent to submit an application. This letter should include the name of the potential applicant, the title of the project, the name of the Project Director/Principal Investigator(s), the amount of funds requested, and a one-page abstract that includes the feedstock to be used, the outputs of the planned integrated biorefinery including their expected volumes and masses, and whether the facility will be a stand alone operation or integrated into an existing operation or facility. Letters of intent will be used to facilitate the merit review process. Failure to submit such letters will not negatively effect a responsive application submitted in a timely fashion. The letter of intent should be sent by E-mail to [GOBiomass@go.doe.gov](mailto:GOBiomass@go.doe.gov)

#### **2. Pre-application.**

- Pre-applications are not required.

### **C. CONTENT AND FORM OF APPLICATION – SF 424**

Mandatory forms and any applicable optional forms (e.g., SF-LLL- Disclosure of Lobbying Activities) must be completed in accordance with the instructions on the forms and the additional instructions below. **Files that are attached to the forms must be in Adobe Portable Document Format (PDF) unless otherwise specified in this announcement.**

#### **1. SF 424 - Application for Federal Assistance.**

Complete all required fields.

#### **2. Other Attachments Form**

Submit the following files with your application and attach them to the Other Attachments Form. Click on “Add Mandatory Other Attachment” to attach the Project Narrative. Click on “Add Optional Other Attachment,” to attach the other files.

#### **Project Narrative File- Mandatory Other Attachment**

The project narrative must not exceed 100 pages, including charts, graphs, maps, photographs, and other pictorial presentations, when printed using standard 8.5” by 11” paper with 1 inch margins (top, bottom, left, and right). **EVALUATORS WILL REVIEW ONLY THE NUMBER OF PAGES SPECIFIED IN THE PRECEDING SENTENCE.** The



font must not be smaller than 11 point. Do not include any Internet addresses (URLs) that provide information necessary to review the application. See Part VIII.D for instructions on how to mark proprietary application information. Save the information in a single file named "Project.pdf," and click on "Add Mandatory Other Attachment" to attach.

The project narrative must include:

- Project Objectives. This section should provide a clear, concise statement of the specific objectives/aims of the proposed project.
- Merit Review Criteria Discussion. The section should be formatted to address each merit review criterion and sub-criterion listed in Section V. A. See Appendix C for specific instructions on what should be addressed in this section of the Project Narrative. Provide sufficient information so that reviewers will be able to evaluate the application in accordance with these merit review criteria. DOE/NNSA WILL EVALUATE AND CONSIDER ONLY THOSE APPLICATIONS THAT ADDRESS SEPARATELY EACH MERIT REVIEW CRITERION AND SUB-CRITERION.

#### **Project Summary/Abstract File**

The project summary/abstract must contain a summary of the proposed activity suitable for dissemination to the public. It should be a self-contained document that identifies the name of the applicant, the project director/principal investigator(s), the project title, the objectives of the project, a description of the project, including methods to be employed, the potential impact of the project (i.e., benefits, outcomes), and major participants (for collaborative projects). This document must not include any proprietary or sensitive business information as the Department may make it available to the public. The project summary must not exceed 1 page when printed using standard 8.5" by 11" paper with 1" margins (top, bottom, left and right) with font not smaller than 11 point. Save this information in a file named "Summary.pdf," and click on "Add Optional Other Attachment" to attach.

#### **SF 424 C Excel, Budget Information – Construction Programs File**

A SF 424 C form should be completed for the design and construction phase of the project. This should include all activities up to and including the shakedown period. A separate budget for each year of support requested and a cumulative budget for the total project period up to and including shakedown must be provided. Use the SF 424 C Excel, "Budget Information – Construction Programs" form on the Applicant and Recipient Page at <http://grants.pr.doe.gov>. Funds may be requested under any Cost Classification as long as the item and amount are necessary to perform the proposed work, meet all the criteria for allowability under the applicable Federal cost principles, and are not prohibited by the funding restrictions in this announcement (See PART IV, G). Save the information in a single file named "SF424C.xls," and click on "Add Optional Other Attachment" to attach.

#### **SF 424 A Excel, Budget Information – Non-Construction Programs File**

A SF 424 A form should be completed for the operating phase of the project and other activities separate from design, engineering and construction. This should include all activities and operating expenses following the shakedown period. A separate budget for each year of support requested and a cumulative budget for the total project period

covering plant operations must be provided. Use the SF 424 A Excel, "Budget Information – Non Construction Programs" form on the Applicant and Recipient Page at <http://grants.pr.doe.gov>. Funds may be requested under any of the Object Class Categories as long as the item and amount are necessary to perform the proposed work, meet all the criteria for allowability under the applicable Federal cost principles, and are not prohibited by the funding restrictions in this announcement (See PART IV, G). Save the information in a single file named "SF424A.xls," and click on "Add Optional Other Attachment" to attach.

### **Budget Justification File**

Justification for costs proposed in each Object Class Category/Cost Classification category must be provided (e.g., identify key persons and personnel categories and the estimated costs for each person or category; provide a list of equipment and cost of each item; identify proposed subaward/consultant work and cost of each subaward/consultant; describe purpose of proposed travel, number of travelers and number of travel days; list general categories of supplies and amount for each category; and provide any other information you wish to support your budget). Provide the name of your cognizant/oversight agency, if you have one, and the name and phone number of the individual responsible for negotiating your indirect rates. If cost sharing is required, provide an explanation of the source, nature, amount and availability of any proposed cost sharing. Save this information in a single file named "Budget.pdf," and click on "Add Optional Other Attachment" to attach.

### **Subaward Budget File(s)**

Applicants must provide a separate budget (i.e., budget for each budget year and a cumulative budget) for each subawardee that is expected to perform work estimated to be more than \$100,000 or 50 percent of the total work effort (which ever is less). Use the SF 424 A Excel for Non Construction Programs or the SF 424 C Excel for Construction Programs. These forms are found on the Applicant and Recipient Page at <http://grants.pr.doe.gov>. Save each Subaward budget in a separate file. Use up to 10 letters of the subawardee's name (plus .xls) as the file name (e.g., ucla.xls or energyres.xls), and click on "Add Optional Other Attachment" to attach.

### **Certifications/Assurances for Use with SF 424 File**

Applicants must complete and provide the "Certifications and Assurances for Use with SF 424" form on the Applicant and Recipient Page at <http://grants.pr.doe.gov>. Submission of an electronic application through Grants.gov constitutes the submission of a signed document. Type the name of the person responsible for providing the certifications and assurances in the signature block and save as a pdf file. Do not submit a scanned copy of the form. Name the file "Certs.pdf," and click on "Add Optional Other Attachment" to attach.

### **Commitment Letters from Third Parties Contributing to Cost Sharing**

The applicant must have firm funding commitment letters from third parties expected to contribute to cost sharing. At the time the application is submitted, the applicant must identify for each participant providing cost sharing: 1) the name of the organization; 2) the proposed dollar amount to be provided; 3) the amount as a percentage of the total project cost; and 4) the proposed cost sharing – cash, services, or property. For projects with multiple cost sharing partners, summarize the information in a table format. Provide the information in a single file named "CLTP" and click on "Add Optional Other Attachment" to attach.

Attachment” to attach.

### **Biographical Sketch File**

Provide a biographical sketch for each key person proposed, including subawardees and consultants if they meet the definition of key person. A key person is any individual who contributes in a substantive, measurable way to the execution of the project. Save all biographical sketches in a single file named “bio.pdf” and click on “Add Optional Other Attachment” to attach. The biographical information for each person must not exceed 2 pages when printed on 8.5” by 11” paper with 1 inch margins (top, bottom, left, and right) with font not smaller than 11 point and must include:

*Education and Training.* Undergraduate, graduate and postdoctoral training, provide institution, major/area, degree and year.

*Professional Experience:* Beginning with the current position list, in chronological order, professional/academic positions with a brief description

*Publications.* Provide a list of up to 10 publications most closely related to the proposed project. For each publication, identify the names of all authors (in the same sequence in which they appear in the publication), the article title, book or journal title, volume number, page numbers, year of publication, and website address if available electronically.

Patents, copyrights and software systems developed may be provided in addition to or substituted for publications.

*Synergistic Activities.* List no more than 5 professional and scholarly activities related to the effort proposed.

*Related Experience:* In addition, submit experience in designing, engineering, constructing and operating facilities of the scale requested in this FOA. Additionally, experience in operating biomass, fuel, or chemical processing of this scale should be provided. An individual may not have experience in all areas but it is the experience with operations of this scale that needs to be noted.

### **Budget for DOE/NNSA Federally Funded Research and Development Center (FFRDC) Contractor, if applicable.**

If a DOE/NNSA FFRDC contractor is to perform a portion of the work, a DOE Field Work Proposal must be provided in accordance with the requirements in DOE Order 412.1 Work Authorization System. This order and the DOE Field Work Proposal form are available at <http://grants.pr.doe.gov>. Use up to 10 letters of the FFRDC name (plus .pdf) as the file name (e.g., lanl.pdf or anl.pdf), and click on “Add Optional Other Attachment” to attach.

### **Environmental Checklist**

Each application must include an environmental checklist, form EF1, which is filled out electronically and submitted via DOE’s website. Applicants should go to:

<https://www.eere-pmc.energy.gov/NEPA.asp> and follow the instructions on the page

The submission type will be: DOE GO EF1 Environmental Checklist. An example of a completed EF1 form can be found at: <https://www.eere->

[pmc.energy.gov/NEPARecipients/EF1DemoSample.pdf](http://pmc.energy.gov/NEPARecipients/EF1DemoSample.pdf).

### Reference Checks on Federal Awards

Provide the information below for at least five, and no more than eight, federal awards that were received by either your organization or principal investigator in the last five years for technologies relevant to this announcement, with award values in excess of \$1,000,000. If applicant has fewer than five awards meeting this criteria, first submit those that meet the criteria, and for the remainder, provide information for federal awards under \$1,000,000 received by either the organization or principal investigator for all technologies in the last five years.

The following information is required for each federal award: 1) AWARD TITLE; 2) INSTRUMENT NUMBER; 3) TOTAL AWARD VALUE (\$); 4) PERIOD OF PERFORMANCE (Dates); 5) APPLICANT'S PROJECT DIRECTOR (Name, Address, Telephone Number [including area code]); and 6) FEDERAL AGENCY MAKING AWARD (Agency Name, Federal Program Manager, Federal Program Manager's Address, Federal Program Manager's Telephone Number [including area code]).

- 3. SF-LLL Disclosure of Lobbying Activities** If applicable, complete SF- LLL. Applicability: If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the grant/cooperative agreement, a Standard Form - LLL, "Disclosure Form to Report Lobbying" must be completed and submitted.

### Summary of Required Forms/Files

Each application must include the following documents:

Name of Document	Format	File Name
Application for Federal Assistance – SF424	PureEdge Form	N/A
Other Attachments Form: Attach the following files to this form:	PureEdge Form	N/A
Project Narrative File	PDF	Project.pdf
Project Summary/Abstract File	PDF	Summary.pdf
SF 424C File - Budget Information for Construction Programs – to cover the construction period, only.	Excel	SF424C.xls
SF 424A File - Budget Information for Non-Construction Programs – to cover the operating period, only	Excel	SF424A.xls

Budget Justification File to support the SF 424C	PDF	Budget.pdf
Budget Justification File to support the SF 424A	PDF	PF20.pdf
Subaward Budget File(s)	Excel	See Instructions
Certifications/Assurances File	PDF	Certs.pdf
Commitment Letters from Third Parties Contributing to Cost Sharing File, if applicable.	PDF	CLTP.pdf
Biographical Sketch File	PDF	Bio.pdf
Budget for FFRDC Contractor, if applicable	PDF	Name.pdf
Reference Checks on Federal Awards	PDF	RefChecks.pdf
SF-LLL Disclosure of Lobbying Activities, if applicable	PureEdge Form	N/A
Environmental Checklist EF-1	PDF	EF1.pdf

**D. SUBMISSIONS FROM SUCCESSFUL APPLICANTS.**

- Successful applicants must submit the information listed below not later than 45 calendars days after notification of selection. Applicants who fail to provide the information within the required time period may be eliminated from further consideration.

What to submit	Required Form or Format
<b>Designated Responsible Employee for complying with national policies prohibiting discrimination.</b> Provide organization name, project title, DOE application tracking number and the name, title, and phone number of Designated Responsible Employee for complying with national policies prohibiting discrimination (See 10 CFR 1040.5).	No special format.  E-mail information to: <a href="mailto:ricky.newton@go.doe.gov">ricky.newton@go.doe.gov</a>
<b>Representation of Limited Rights Data and Restricted Software</b>	Use form on Applicant and Recipient Page at <a href="http://grants.pr.doe.gov">http://grants.pr.doe.gov</a> . Send this representation to <a href="mailto:melissa.wise@go.doe.gov">melissa.wise@go.doe.gov</a>
<b>Financial Assistance Pre-Award Information Sheet, PF 19</b>	Use form on Recipient Resources page at <a href="http://www.eere-">http://www.eere-</a>

	<a href="http://pmc.energy.gov/forms.asp">pmc.energy.gov/forms.asp</a>
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#### **E. SUBMISSION DATES AND TIMES.**

**1. Pre-application Due Date.** Pre-applications are not required.

**2. Application Due Date.**

Applications must be received by August 10, 2006, not later than 11:59:00 PM Eastern Time. Applications may be submitted at any time prior to this deadline. Applicants are encouraged to transmit their applications well before the deadline, especially given the large size of this application. APPLICATIONS RECEIVED AFTER THE DEADLINE WILL NOT BE REVIEWED OR CONSIDERED FOR AWARD.

#### **F. INTERGOVERNMENTAL REVIEW.**

This program is not subject to Executive Order 12372 – Intergovernmental Review of Federal Programs.

#### **G. FUNDING RESTRICTIONS.**

Cost Principles. Costs must be allowable in accordance with the applicable Federal cost principles referenced in 10 CFR part 600.

Pre-award Costs. Recipients may charge to an award resulting from this announcement pre-award costs that were incurred within the ninety (90) calendar day period immediately preceding the effective date of the award, if the costs are allowable in accordance with the applicable Federal cost principles referenced in 10 CFR part 600. Recipients must obtain the prior approval of the contracting officer for any pre-award costs that are for periods greater than this 90 day calendar period.

Pre-award costs are incurred at the applicant's risk. DOE is under no obligation to reimburse such costs if for any reason the applicant does not receive an award or if the award is made for a lesser amount than the applicant expected.

#### **H. OTHER SUBMISSION AND REGISTRATION REQUIREMENTS.**

**1. Where to Submit.**

**APPLICATIONS MUST BE SUBMITTED THROUGH GRANTS.GOV TO BE CONSIDERED FOR AWARD.** Submit electronic applications through the "Apply for Grants" function at [www.Grants.gov](http://www.Grants.gov). If you have problems completing the registration process or submitting your application, call Grants.gov at 1-800-518-4726 or send an email to [support@grants.gov](mailto:support@grants.gov).

**2. Registration Process.**

You must COMPLETE the one-time registration process (all steps) before you can submit your first application through Grants.gov (See [www.grants.gov/GetStarted](http://www.grants.gov/GetStarted)). **We recommend that you start this process at least two weeks before the application due date.** It may take 14 days or more to complete the entire process. Use the

Grants.gov Organizational Registration Checklists at <http://www.grants.gov/assets/OrganizationRegCheck.doc> to guide you through the process. **IMPORTANT:** During the CCR registration process, you will be asked to designate an E-Business Point of Contact (EBIZ POC). The EBIZ POC must obtain a special password called "Marketing Partner identification Number" (MPIN).

## **PART V - APPLICATION REVIEW INFORMATION**

### **A. CRITERIA**

#### **1. Initial Review Criteria.**

- Prior to a comprehensive merit review, DOE will perform an initial compliance review to determine that (1) the applicant is eligible for an award; (2) the minimum cost share has been met; and (3) the proposed project is responsive to the following requirements of the FOA:
  - The mass of biomass feedstock throughput is at least 700 dry metric tonnes per day.
  - If a transposition biofuel is being produced, that it meets the following definition - ethanol, biodiesel or any fungible replacement for gasoline or diesel as a transportation fuel produced from lignocellulosics.

#### **2. Merit Review Criteria.** Applications will be reviewed in accordance with the following guidelines:

All compliant applications will undergo a comprehensive technical evaluation by a Merit Review Committee. This evaluation will consist of a merit review of the submitted written application (a written application evaluation). In addition, this review may be followed by a request for an oral presentation (an oral presentation evaluation) for up to five of the highest ranked applications.

The written application evaluation will consist of an examination of each application to ensure that all requirements listed in the document cited in Appendix C, Format and Instructions for the Project Narrative, are addressed. The written application evaluation will consist of a critical examination of the quality of the responses to Appendix C instructions with respect to each of the evaluation criteria. If an application does not address a requirement of Appendix C, the application's score will reflect the omission.

The oral presentation, if determined necessary, will consist of two parts – the oral presentation (up to one hour) by up to five of the highest ranked applicants followed by a question and answer session (up to one hour) conducted by the Merit Review Committee. The purpose of the oral presentation is to ensure that the Merit Review Committee fully understands the details of the proposed project and has an opportunity to ask clarifying questions of the applicants. The oral presentation evaluation will consist of a critical examination of the quality of the responses to Appendix C instructions with respect to each of the evaluation criteria.

It is DOE's intent to schedule oral presentations in early November 2006. The presentation slides (only electronic slides, not viewgraphs), including hard paper copies, must be provided to DOE within five working days of the actual scheduled oral presentation meeting. Proprietary information must be marked on the slides.

A final ranking of these applications will be made by the merit review committee following the oral presentations.



The use of independent engineering and financial consultants will be employed in all aspects of the merit review process. A program policy factor review will be conducted by DOE personnel within the Biomass Program following the merit review process.

The objective merit review criteria applied to the information provided under the project narrative establishes what DOE considers to be the determining factors for award. Cost will not be point scored, but costs will be evaluated relative to the proposed plans. The objective merit review criteria listed below will be used by evaluators to determine the value of the Application in meeting the objective outcomes of the FOA. The evaluation weights for the objective merit review criteria are shown as percentages for each criterion. Criterion 1 has two major categories, Approach and Feasibility, with accompanying sub-criteria. Criterion 2 is comprised of one category only, Replicability, and its accompanying sub-criteria. The specific review criteria are as follows:

**Criterion 1. The likelihood that the proposed project is able to operate profitably without direct Federal subsidy after initial construction costs are paid. (70% equally divided between A and B)**

**A. Approach:**

The extent to which the proposed feedstock, process engineering evaluations, biorefinery siting, proposed technology, energy, emissions and economic analyses are properly developed, well-integrated, and demonstrate that the project can potentially operate profitably.

**B. Feasibility:**

The likelihood that the proposed demonstration can be accomplished within the proposed budget and the schedule by the team given their experience, past performance, past progress on the proposed technology, available financial and material resources, project plan, proposed budget and operational management.

**Criterion 2. The extent to which the application demonstrates that the proposed biorefinery project can be easily replicated based on the proposed deployment plan, including schedule for deployment and commercialization of additional operations. (30%)**

The geographic component of replicability is described as follows: Biorefinery operations that can be sited at multiple facilities across a wide geographic area are considered replicable (see Appendix C, Criterion 2).

**3. Other Selection Factors.  
Program Policy Factors**

- The selection official will consider the following program policy factors in the selection process:
  - Geographic diversity per Section 932 of EPOA 2005
  - Cost share in excess of the minimum required 60%.
  - Technological diversity, e.g., choice of feedstocks and outputs per Section 932 of EPOA 2005

## **B. REVIEW AND SELECTION PROCESS.**

### **1. Merit Review.**

- Applications that pass the initial review will be subjected to a merit review in accordance with the guidance provided in the "Department of Energy Merit Review Guide for Financial Assistance and Unsolicited Proposals." This guide is available under Financial Assistance, Regulations and Guidance at <http://professionals.pr.doe.gov/ma5/ma-5web.nsf/?Open>. In addition, Oral Presentations may be required of up to five of the highest ranked applications.
- As part of this Merit Review, DOE will conduct an independent third party review of financial capability of applicants (including personal credit information of the principal(s) of a small business if there is insufficient information to determine financial capability of the organization).

### **2. Selection.** The Selection Official will consider the merit review recommendation, program policy factors, and the amount of funds available in making selections under this FOA.

### **3. Discussions and Award.**

- The Government may enter into discussions with selected applicants for any reason deemed necessary, including but not limited to: (1) the budget is not appropriate or reasonable for the requirement; (2) the Government needs additional information to determine that the recipient is capable of complying with the requirements in Section 932 of EAct 2005 and applicable DOE Financial Assistance Regulations; and/or (3) special terms and conditions are required. Failure to resolve satisfactorily the issues identified by the Government during discussions will preclude award. If this occurs, the Selection Official is free to make further selections.

## **C. ANTICIPATED NOTICE OF SELECTION AND AWARD DATES.**

- DOE anticipates notifying applicants selected for award by early January, 2007 and making awards by May, 2007.

## **PART VI - AWARD ADMINISTRATION INFORMATION**

### **A. AWARD NOTICES.**

#### **1. Notice of Selection.**

- DOE will notify applicants selected for award. This notice of selection is not an authorization to begin performance. (See Part IV.G with respect to the allowability of pre-award costs.)

Organizations whose applications have not been selected will be advised as promptly as possible. This notice will explain why the application was not selected.

#### **2. Notice of Award.**

- A Notice of Financial Assistance Award issued by the contracting officer is the authorizing award document. It normally includes, either as an attachment or by reference: 1. Special Terms and Conditions; 2. Applicable program regulations, if any; 3. Application as approved by DOE/NNSA.; 4. DOE assistance regulations at 10 CFR part 600, or, for Federal Demonstration Partnership (FDP) institutions, the FDP terms and conditions; 5. National Policy Assurances To Be Incorporated As Award Terms; 6. Budget Summary; and 7. Federal Assistance Reporting Checklist, which identifies the reporting requirements.

### **B. ADMINISTRATIVE AND NATIONAL POLICY REQUIREMENTS.**

#### **1. Administrative Requirements.**

The administrative requirements for DOE grants and cooperative agreements are contained in 10 CFR part 600 (See: <http://ecfr.gpoaccess.gov>), except for grants made to Federal Demonstration Partnership (FDP) institutions. The FDP terms and conditions and DOE FDP agency specific terms and conditions are located on the National Science Foundation web site at [http://www.nsf.gov/awards/managing/fed\\_dem\\_part.jsp](http://www.nsf.gov/awards/managing/fed_dem_part.jsp).

#### **2. Special Terms and Conditions and National Policy Requirements.**

##### **Special Terms and Conditions and National Policy Requirements.**

The DOE Special Terms and Conditions for Use in Most Grants and Cooperative Agreements are located at <http://grants.pr.doe.gov>. The National Policy Assurances To Be Incorporated As Award Terms are located at <http://grants.pr.doe.gov>.

##### **Intellectual Property Provisions.**

The Government's rights to Intellectual Property will be subject to negotiation prior to award. However, the standard DOE financial assistance intellectual property provisions applicable to the various types of recipients are located at [http://www.gc.doe.gov/techtrans/sipp\\_matrix.html](http://www.gc.doe.gov/techtrans/sipp_matrix.html).

##### **Statement of Substantial Involvement.**

DOE's substantial involvement will include the following:

- Maintaining frequent communications with the recipient to monitor project progress;
- Providing input on major project activities;

- Participating in each go/no-go decision point during stage gate reviews; and
- Facilitating efficient and facile interaction between the award recipient and the FFRDC, if such organizations are involved.

**Funding Considerations.**

Federal matching funds will be allocated for up to 10% of the total project cost of preliminary engineering and permitting. Federal funds for detailed engineering, procurement and construction will only be committed after the completion and issuance of the appropriate permits.

**C. REPORTING.**

Reporting requirements are identified on the Federal Assistance Reporting Checklist, DOE F 4600.2, attached to the award agreement. See <http://www.eere.energy.gov/golden/PDFs/4600-2.pdf> for the proposed Checklist for this program. It is anticipated that DOE will require at least quarterly reports for the purpose of tracking project schedule, costs, and performance to ensure implementation of appropriate project controls (e.g., Earned Value Management). However, DOE reserves the right to negotiate reporting requirements after selection but prior to the award.

## **PART VII - QUESTIONS/AGENCY CONTACTS**

### **A. QUESTIONS.**

Questions regarding the content of the announcement must be submitted through the "Submit Question" feature of the DOE Industry Interactive Procurement System (IIPS) at <http://e-center.doe.gov>. Locate the program announcement on IIPS and then click on the "Submit Question" button. Enter required information. You will receive an electronic notification that your question has been answered. DOE/NNSA will try to respond to a question within 3 business days, unless a similar question and answer have already been posted on the website.

Questions relating to the registration process, system requirements, how an application form works, or the submittal process must be directed to Grants.gov at 1-800-518-4726 or [support@grants.gov](mailto:support@grants.gov). DOE/NNSA cannot answer these questions.

### **B. AGENCY CONTACT.**

Name: Melissa Wise

E-mail: [Melissa.Wise@go.doe.gov](mailto:Melissa.Wise@go.doe.gov)

FAX: 303 275-4754

## **PART VIII - OTHER INFORMATION**

### **A. MODIFICATIONS.**

Notices of any modifications to this announcement will be posted on Grants.gov and the DOE Industry Interactive Procurement System (IIPS). You can receive an email when a modification or an announcement message is posted by joining the mailing list for this announcement through the link in IIPS. When you download the application at Grants.gov, you can also register to receive notifications of changes through Grants.gov.

### **B. GOVERNMENT RIGHT TO REJECT OR NEGOTIATE.**

DOE reserves the right, without qualification, to reject any or all applications received in response to this announcement and to select any application, in whole or in part, as a basis for negotiation and/or award.

### **C. COMMITMENT OF PUBLIC FUNDS.**

The Contracting Officer is the only individual who can make awards or commit the Government to the expenditure of public funds. A commitment by other than the Contracting Officer, either explicit or implied, is invalid.

### **D. PROPRIETARY APPLICATION INFORMATION.**

Patentable ideas, trade secrets, proprietary or confidential commercial or financial information, disclosure of which may harm the applicant, should be included in an application only when such information is necessary to convey an understanding of the proposed project. The use and disclosure of such data may be restricted, provided the applicant includes the following legend on the first page of the project narrative and specifies the pages of the application which are to be restricted:

“The data contained in pages \_\_\_\_\_ of this application have been submitted in confidence and contain trade secrets or proprietary information, and such data shall be used or disclosed only for evaluation purposes, provided that if this applicant receives an award as a result of or in connection with the submission of this application, DOE shall have the right to use or disclose the data herein to the extent provided in the award. This restriction does not limit the government’s right to use or disclose data obtained without restriction from any source, including the applicant.”

To protect such data, each line or paragraph on the pages containing such data must be specifically identified and marked with a legend similar to the following:

“The following contains proprietary information that (name of applicant) requests not be released to persons outside the Government, except for purposes of review and evaluation.”

### **E. EVALUATION AND ADMINISTRATION BY NON-FEDERAL PERSONNEL.**

In conducting the merit review evaluation, the Government may seek the advice of qualified non-Federal personnel as reviewers. The Government may also use non-Federal personnel to conduct routine, nondiscretionary administrative activities. The applicant, by submitting its application, consents to the use of non-Federal reviewers/administrators. Non-Federal reviewers must sign conflict of interest and non-disclosure agreements prior to reviewing an application. Non-Federal personnel conducting administrative activities must sign a non-disclosure agreement.

**F. NOTICE REGARDING ELIGIBLE/INELIGIBLE ACTIVITIES.**

Eligible activities under this program include those which describe and promote the understanding of scientific and technical aspects of specific energy technologies, but not those which encourage or support political activities such as the collection and dissemination of information related to potential, planned or pending legislation.

**G. REAL PROPERTY AND EQUIPMENT.**

It is the intent of the Department not to assert disposition rights or interests in property and equipment acquired by a recipient in the prosecution of project(s) awarded under this Funding Opportunity Announcement. The Department intends to waive its rights under 10 C.F.R. § 600.321 for such project(s) in order to facilitate third party debt and equity participation in the project(s).

**REFERENCE MATERIAL**

**Part IV.C. CONTENT AND FORM OF APPLICATION – SF 424A**

Budget Justification File – Applicants should complete the Cost Reasonableness Determination, PF20 form, or equivalent, to justify the costs proposed in each Object Class Category/Cost Classification category. [Click here for PF20 form.](#)

**Appendix A – Definitions**

**Appendix B – Grants.gov**

**Appendix C – Format and Instructions for the Project Narrative**

Each application must address each of the items in Appendix C. The evaluation criteria will be applied to each item in Appendix C

**Appendix D – Section 932 of EPA Act 2005**

This contains a copy of the language in this law.

**Appendix E– Example of an Ethanol Production Process from Lignocellulosics**

## Appendix A – Definitions

**“Amendment”** means a revision to a solicitation.

**"Applicant"** means the legal entity or individual signing the Application. This entity or individual may be one organization or a single entity representing a group of organizations (such as a Consortium) that has chosen to submit a single Application in response to a solicitation.

**"Application"** means the documentation submitted in response to a solicitation. NOTE: Application is referred to as Proposal in IIPS.

**“Authorized Organization Representative (AOR)”** is the person with assigned privileges who is authorized to submit grant applications through Grants.gov on behalf of an organization. The privileges are assigned by the organization's E-Business Point of Contact designated in the CCR.

**"Award"** means the written documentation executed by a DOE Contracting Officer, after an Applicant is selected, which contains the negotiated terms and conditions for providing Financial Assistance to the Applicant. A Financial Assistance Award may be either a Grant or a Cooperative Agreement.

**"Budget"** means the cost expenditure plan submitted in the Application, including both the DOE contribution and the Applicant Cost Share.

**"Consortium (plural consortia)"** means the group of organizations or individuals that have chosen to submit a single Application in response to a solicitation.

**"Contracting Officer"** means the DOE official authorized to execute Awards on behalf of DOE and who is responsible for the business management and non-program aspects of the Financial Assistance process.

**"Cooperative Agreement"** means a Financial Assistance instrument used by DOE to transfer money or property when the principal purpose of the transaction is to accomplish a public purpose of support or stimulation authorized by Federal statute, and Substantial Involvement (see definition below) is anticipated between DOE and the Applicant during the performance of the contemplated activity.

**"Cost Sharing"** means the respective share of Total Project Costs to be contributed by the Applicant and by DOE. The percentage of Applicant Cost Share is to be applied to the Total Project Cost (i.e., the sum of Applicant plus DOE Cost Shares) rather than to the DOE contribution alone.

**“Central Contractor Registry (CCR)”** is the primary database which collects, validates, stores and disseminates data in support of agency missions. Funding Opportunity Announcements which require application submission through Grants.gov require that the organization first be registered in the CCR at <http://www.grants.gov/CCRRegister>.

**“Credential Provider”** is an organization that validates the electronic identity of an individual through electronic credentials, PINS, and passwords for Grants.gov. Funding Opportunity Announcements which require application submission through Grants.gov require that the individual applying on behalf of an organization first be registered with the Credential Provider at <http://www.grants.gov/CredentialProvider>.



**“Data Universal Numbering System (DUNS) Number”** is a unique nine-character identification number issued by Dun and Bradstreet (D&B). Organizations must have a DUNS number prior to registering in the CCR. Call 1-866-705-5711 to receive one free of charge. <http://www.grants.gov/RequestaDUNS>

**“E-Business Point of Contact (POC)”** is the individual who is designated as the Electronic Business Point of Contact in the CCR registration. This person is the sole authority of the organization with the capability of designating or revoking an individual’s ability to submit grant applications on behalf of their organization through Grants.gov. <http://www.grants.gov/assets/EBIZRegCheck.doc>

**“E-Find”** is a Grants.gov webpage where you can search for Federal Funding Opportunities in FedGrants. <http://www.grants.gov/FindGrantOpportunities?search=basic>

**“Fedgrants.gov”** is the official website where you can locate Federal Funding Opportunities <http://fedgrants.gov/Applicants/index.html>.

**“Financial Assistance”** means the transfer of money or property to an Applicant or Participant to accomplish a public purpose of support authorized by Federal statute through Grants or Cooperative Agreements and sub-awards. For DOE, it does not include direct loans, loan guarantees, price guarantees, purchase agreements, Cooperative Research and Development Agreements (CRADAs), or any other type of financial incentive instrument.

**“Federally Funded Research and Development Center (FFRDC)”** means a research laboratory as defined by Federal Acquisition Regulation 35.017.

**“Funding Opportunity Announcement (FOA)”** is a publicly available document by which a Federal agency makes known its intentions to award discretionary grants or cooperative agreements, usually as a result of competition for funds. Funding opportunity announcements may be known as program announcements, notices of funding availability, solicitations, or other names depending on the agency and type of program.

**“Grant”** means a Financial Assistance instrument used by DOE to transfer money or property when the principal purpose of the transaction is to accomplish a public purpose of support or stimulation authorized by Federal statute, and no Substantial Involvement is anticipated between DOE and the Applicant during the performance of the contemplated activity.

**“Grants.gov”** is the “storefront” web portal which allows organizations to electronically find and apply for competitive grant opportunities from all Federal grant-making agencies. Grants.gov is THE single access point for over 900 grant programs offered by the 26 Federal grant-making agencies. <http://www.grants.gov>

**“Industry Interactive Procurement System (IIPS)”** is DOE’s Internet-based procurement system which allows access to DOE’s business opportunities database, allows user registration and submittal of Applications: <http://e-center.doe.gov/>.

**“Key Personnel”** means the individuals who will have significant roles in planning and implementing the proposed Project on the part of the Applicant and Participants, including FFRDCs.

**“Marketing Partner Identification Number (MPIN)”** is a very important password designated by your organization when registering in CCR. The E-Business Point of Contact will need the

MPIN to login to Grants.gov to assign privileges to the individual(s) authorized to submit applications on behalf of your organization. The MPIN must have 9 digits containing at least one alpha character (must be in capital letters) and one number (no spaces or special characters permitted).

**"Participant"** for purposes of this FOA only, means any entity, except the Applicant substantially involved in a Consortium, or other business arrangement (including all parties to the Application at any tier), responding to the FOA.

**"Project"** means the set of activities described in an Application, State plan, or other document that is approved by DOE for Financial Assistance (whether such Financial Assistance represents all or only a portion of the support necessary to carry out those activities).

**"Proposal"** is the term used in IIPS meaning the documentation submitted in response to a solicitation. Also see Application.

**"Pure Edge Viewer"** is a small, free program which allows you to access, complete and submit applications electronically and securely through Grants.gov. You will not be able to access, complete, or submit an application through Grants.gov, unless the Pure Edge Viewer is downloaded on your computer. <http://www.grants.gov/DownloadViewer>.

**"Recipient"** means the organization, individual, or other entity that receives a Financial Assistance Award from DOE, is financially accountable for the use of any DOE funds or property provided for the performance of the Project, and is legally responsible for carrying out the terms and condition of the award.

**"Selection"** means the determination by the DOE Selection Official that negotiations take place for certain Projects with the intent of awarding a Financial Assistance instrument.

**"Selection Official"** means the DOE official designated to select Applications for negotiation toward Award under a subject solicitation.

**"Substantial Involvement"** means involvement on the part of the Government. DOE's involvement may include shared responsibility for the performance of the Project; providing technical assistance or guidance which the Applicant is to follow; and the right to intervene in the conduct or performance of the Project. Such involvement will be negotiated with each Applicant prior to signing any agreement.

**"Total Project Cost"** means all the funds to complete the effort proposed by the Applicant, including DOE funds (including direct funding of any FFRDC) plus all other funds that will be committed by the Applicant as Cost Sharing.

## Appendix B – Grants.gov

In addition to the links provided in the Announcement, we are providing Appendix B to assist you in the registration process.

### **“Very Important”**

**Please read through the information below prior to starting the registration process. This information will assist you in making the registration process as seamless as possible. It is important to follow the steps in the order outlined below, allowing the time specified between each of the steps.**

- 1) Request a DUNS Number** - Follow the instructions at <http://www.grants.gov/RequestaDUNS>. It is highly recommended that the DUNS number be requested by telephone at 1-866-705-5711, which will take about 10 minutes. There is no charge. ***Once the telephone registration is completed, you must allow 24 hours before attempting to use the DUNS number in the next step of registering with the Central Contractor Registry (CCR).***
- 2) Register with the Central Contractor Registry (CCR)** - Go to <http://www.grants.gov/CCRRegister> and click on the “Help” button to locate the tutorial. Print the tutorial for reference and follow the instructions in the link above. We also recommend that you print and complete the 7-page CCR Worksheet at <http://www.ccr.gov/CCRRegTemplate.pdf> prior to registration, as it may take up to 3 days to gather the information needed for the worksheet. You are required to designate an Electronic Business Point of Contact (E-Business POC) and a Marketing Partner Identification Number (MPIN) in the CCR. It is important to provide the MPIN to the E-Business POC. For assistance with the CCR, contact the Assistance Center at 1-888-227-2423 or at [CCR@dlis.dla.mil](mailto:CCR@dlis.dla.mil). You may also access the CCR Handbook at <http://www.ccr.gov/handbook.cfm>.
- 3) Register with the Credential Provider** - AORs must register with the Credential Provider. ***AORs must wait a minimum of 3 business days for the CCR to become active before attempting to register with the credential provider.*** Go to <http://www.grants.gov/CredentialProvider> and click on the “Help” button to locate the tutorial. Print the tutorial for reference and follow the instructions in the link above. Record the user ID and password that you enter because you will need this information to register with Grants.gov as an AOR. ***AORs must wait approximately 20 minutes after completing the Credential Provider registration before going to the next step of registering with Grants.gov.*** If you encounter any problems, the Credential Provider may be reached at 800-386-6820 or via email at [eauthhelp@orc.com](mailto:eauthhelp@orc.com) or [pkihelp@orc.com](mailto:pkihelp@orc.com).
- 4) Register with Grants.gov** - AORs must register with Grants.gov, utilizing the User ID and password obtained from registering with the Credential Provider. Go to <https://apply.grants.gov/GrantsgovRegister#> and click on the “Help” button to locate the tutorial. Print the tutorial for reference and follow the instructions in the link above. After you have completed the Grants.gov registration process, you will receive a confirmation that indicates whether your registration was successful.

After AORs successfully register with Grants.gov, an email will be generated to the E-Business

Point of Contact (POC) that was designated in the CCR, informing them that an individual from their organization has registered in Grants.gov to be an AOR, capable of submitting applications in Grants.gov on behalf of their organization. (Further Information regarding the Electronic Business POC is provided below.) AORs will not be able to submit an application until they receive authorization from the E-Business POC. ***If the AOR does not receive an email authorization from the E-Business POC within 1 business day, contact the E-Business POC.*** If you encounter any problems, contact Customer Support at 1-800-518-4726 or [support@grants.gov](mailto:support@grants.gov). For tracking purposes, Customer Support will assign you a case number that should be provided to them each time you call.

**Designate Privileges to the AOR** - The Electronic Business POC is the sole authority of the organization with the capability of designating, or revoking, an individual's ability to submit grant applications on behalf of their organization through Grants.gov. Once the E-Business POC receives the email notification from the individual wishing to be recognized as an AOR, the E-Business POC should go to <https://apply.grants.gov/AorMgrGetID>, click on the "Help" button to locate the tutorial, print the tutorial for reference, then log on utilizing the DUNS Number and the Marketing Partner Identification Number (MPIN) that was designated by their organization when registering in the CCR and follow the instructions for designating privileges to the AOR. If you cannot locate the MPIN, contact the CCR Assistance Center at 1-888-227-2423 or at [CCR@dlis.dla.mil](mailto:CCR@dlis.dla.mil).

**5) Install the PureEdge Viewer – *Authorized Organization Representatives (AORs) are the individuals that will be given the authority to submit applications on behalf of their organization.*** All AORs must download and install the PureEdge Viewer on their computer by following the instructions at <http://www.grants.gov/DownloadViewer>. This small, free program will allow AORs to access, complete, and submit applications electronically and securely. If you encounter any problems, contact customer Support at 1-800-518-4726 or [support@grants.gov](mailto:support@grants.gov). (This step may be done earlier in the process).

**6) Submit Application in Grants.gov** - Once the E-Business POC has authorized privileges to the AOR, the AOR will receive an email notification that they have been given authorization. The AOR may then proceed to submit an application in Grants.gov (see the "Install the PureEdge Viewer" step above). For application instructions, go to <http://www.grants.gov/Apply>. The training demonstration at <http://www.grants.gov/CompleteApplication> will assist AORs in the application process.

Remember that you must open and complete the Application for Federal Assistance (SF-424) first, as this form will automatically populate data fields in other forms. If you encounter any problems, contact customer Support at 1-800-518-4726 or at [support@grants.gov](mailto:support@grants.gov). If you forget your user name or password, follow the instructions provided in the Credential Provider tutorial.

**NOTE: Tutorials may be printed by right-clicking on the tutorial and selecting "print".** In addition to the tutorials, the User Guide is a valuable resource. The User Guide is found at [http://www.grants.gov/GrantsGov UST Grantee/SSL/WebHelp/userguide.doc](http://www.grants.gov/GrantsGov%20UST%20Grantee/SSL/WebHelp/userguide.doc)

## **Appendix C – Format and Instructions for the Project Narrative**

The project narrative should provide the information listed in this Appendix. The project narrative will be evaluated relative to the criteria listed below. This will allow each application to be evaluated by a standardized and consistent set of information. Additional clarifying information is acceptable as long as the page limit is not exceeded. Unless noted, all items must be addressed in the page limit defined in Part IV.C.2. *Please see the table at the end of this Appendix for unit measurements that must be employed.*

**Criterion 1. The likelihood that the proposed project is able to operate profitably without direct Federal subsidy after initial construction costs are paid. (70% equally divided between Approach and Feasibility)**

**Approach:** The extent to which the proposed feedstock, process engineering evaluations, biorefinery siting, proposed technology, energy, emissions and economic analyses are properly developed, well-integrated, and demonstrate that the project can potentially operate profitably (35%).

**Instructions:** In this section, the applicant should address:

### **A. Feedstock Requirements**

**1. Feedstock limitations** - Demonstrate adherence to 932(a) (2) and Section 932(d) (1) (A & C). Include estimates of feedstock volumes and delivered cost to the plant gate that would permit favorable economics in producing a biofuel, bioproduct, petroleum substitute or energy. These data must be fully documented and will require detailed justification for all throughput sizes. Financial & engineering analyses should be the basis for determining throughput scales.

**2. Feedstock Interface with plant** - Describe how the collection and pretreatment of feedstocks is integrated into the operational costs of the advanced biorefinery system being proposed. These data must be provided and fully documented. Provide assurances of feedstock supply during the operational phase of the integrated biorefinery including feedstock supply contracts or other demonstrations of commitment.

**3. Experience with biomass feedstocks** - Describe the level of experience in handling large volumes of biomass feedstock (700 dry metric tonnes per day or more). Define how these large volumes of biomass feedstocks will be managed between the supplier and the user. Document pertinent supplier/applicant experience. In particular, provide detail on relevant experience in handling the specific, proposed biomass feedstock.

**4. Feedstock source management** - Describe in detail the level of experience in sustainably growing, harvesting, transporting, handling and storing large quantities of lignocellulosic feedstocks specifically destined for industrial processing.

*Rating examples* - A feedstock supply contract for two years at a fixed price will result in a higher score than assurances from a grower that the feedstock supply will be available. A feedstock throughput of greater than 700 tonnes per day producing the commensurate output of biofuels would rate somewhat higher in this category than a lower throughput process.

**B. Proposed process, economic and engineering justifications, proposed site(s), that justifies a commercial scale operation. Any system that complies with Section 932(c) is acceptable.**

**1. Process engineering evaluations** - Include process engineering evaluations that justify scale of the facility and throughput. This includes thorough evaluations of mass and energy balances, solids handling issues, materials of construction, waste management issues, and the engineering involved in product isolation, characterization, and purification. The application must include process flow diagrams with stream details.

**2. Integrated Biorefinery Siting Issues— *Technical, legal and economic.*** Siting considerations must include explanations related to feedstock sources and availability. If the proposed system will be integrated into an existing facility, provide an explanation of the benefits and justification for siting along side or as part of such an existing facility. Provide information on who holds title to the land or existing facilities. Proof of rights to use the land or the existing facility by the applicant for a biorefinery should be provided for the scheduled period of performance and until construction loans are paid off.

For a new site, provide justification and benefits for developing a new site. Information should include discussions of cost management, sharing of resources or utilities, transportation infrastructure, and other relevant information. Provide information on who holds title to the land or existing facilities. Proof of rights to use the land or the existing facility by the applicant for a biorefinery should be provided for the scheduled period of performance and until construction loans are paid off.

Please provide any impacts on production costs, if any.

**3. Integrated Biorefinery Siting Issues— *Environmental.*** Explain environmental issues, such as environmental impact assessments that may be required; considerations including use of genetically modified organisms (if employed) or Toxic Substances Control Act (TSCA) requirements that may be imposed due to manufacture of new compounds; and any other permitting issues that are anticipated. Provide a plan for dealing with these environmental issues, or if permits already exist, explain how these existing permits will accommodate the environmental issues in demonstrating this process. List and describe the environmental, pollution control, land use, zoning, licenses and agreements that will be required for the life of the project. Include estimated costs for obtaining and maintaining compliance. Include plans and costs for complying with the National Environmental Policy Act (NEPA) as this will expedite negotiations if an application is selected for award.

Please provide any impacts on production costs, if any.

*Rating examples* – A proposed integrated biorefinery operation based on a previous pilot-plant or semi-works project at 10-20% of the proposed commercial scale operation would receive better scores than one with a lesser level of experience. Scores will be commensurate with the progress made to date and the level of completeness of environmental permitting, environmental impact assessments, as well as other federal, regional and local permits and regulations supporting the plant's operation. At a minimum, all permitting processes and regulation requirements must be identified with anticipated timelines. Failure to address the permitting and regulatory process will be

considered non-responsive. A timeline justified by experience would rate higher consideration than a timeline based simply on estimates.

### C. Energy, Emissions and Economics

**1. Oil displacement** - Include estimates of barrels of oil displaced via production of a biofuel, chemical or substitute for petroleum-based feedstocks or products, or energy (heat and power). An estimate for this facility should be developed as well as an estimate for this system if it were replicated to its maximum potential based on feedstock supplies. Explain assumptions. Cite references on energy content of the fuel, chemical or substitute for petroleum-based feedstocks or products. Employ the following table to document oil displacement:

**Table 1 - Calculating energy impacts in barrels of oil**

Product (provide units)	Btu or joule content per L or kg	Annual output planned for this plant based on L or kg	Btu of total output per annum for this facility ( <i>convert joules to Btus</i> )	Equivalent Barrels of Oil	Estimated Market Penetration (see note below)	Total barrels of oil displaced at full market penetration (replicated fully)
Ethanol (L)	20,236	20,000,000	4.0E+11	69,779	5	348,897
Electricity (per kg biomass)	10,000	5.5E+10	5.5E+10	9,483	5	47,414
			0.0E+00	0		0
			0.0E+00	0		0
			0.0E+00	0		0
			0.0E+00	0		0

Notes for Table: Ethanol and power are given as examples. In the case of power or heat, the entry in column 4 will be the same as the entry in column 3 (basis for this example is 50 metric tonnes/d converted to electricity at a 30% conversion efficiency operating 365 days per year). Assume a higher heating value (HHV) of  $5.8 \times 10^6$  Btu or  $6.1 \times 10^9$  joules in a barrel of oil. Employ the lower heating value (LHV) of any biofuel produced (ethanol is 20,236 Btu/L or 76,594 Btu/gal) per the API Technical Data Book. It is recognized that the numbers for a barrel of oil cited here are the HHV. If you can correct to the HHV for the biofuel or chemical please do so. If not, indicate so in your estimates. (Since the Energy Information Agency does not provide the hydrogen content of gasoline or crude oil, it is hard to estimate a LHV for comparison and best estimates are requested). In this table, show barrels of oil displaced for this plant and the total barrels of oil displaced based on a realistic market penetration estimate if the operation is producing products successfully. Represent % market penetration by the number of plants estimated to be built by the applicant as a result of this first proposed plant, with specific output capacity as a percentage of the output that would meet the needs for projected markets in 2015. Use EIA market projections, Chemical Economics Handbook values or other citable source for 2015 numbers.

**2. Waste streams and emissions** - Include an assessment of potential waste streams and emissions, and a means to manage or mitigate them, such as use of more efficient



processing technologies. Use the estimators provided by the Industrial Technologies program to quantify reduction in waste emissions ([http://www.energetics.com/ies\\_tool](http://www.energetics.com/ies_tool)). Show the emissions in kg/kg of product produced for this plant and for the Nth plant. The waste stream assessment must not only address steady state operations, but must also anticipate and address process upsets by showing an estimate of the range of wastes and emissions that will need to be managed *{Only the summary information will count against the page limit. Supporting calculations and tables may be put in an appendix and will not count as part of the page limit}*.

**3. Production costs** - Include an estimate of production costs of the product(s) and, if appropriate, compare such costs to that required to produce the same product(s) from petrochemical sources. Provide production cost estimates for this first commercial plant (\$/L or \$/kg) and the estimated cost of the Nth plant based on the potential availability of the feedstock. Provide this information in summary tabular form similar to that shown in the example in Appendix E. The example shows the analysis for an ethanol from lignocellulosics production facility based on a base case analysis by the National Renewable Energy Laboratory for a biochemical based process (Aden, A. et.al, 2002, <http://www.nrel.gov/docs/fy02osti/32438.pdf>). This is simply a representative example. Do not simply replicate these tables or data. The tables or data in an application must provide analogous information and detail for the particular process configuration and flow. The application must include a table or graphic that shows the cost contributions by unit operation process, capital costs, and debt costs. An example of a cost by area graphic is provided for consideration in Appendix E. These will be used for comparison between applications and thus the units must be consistent. An applicant may choose to have a different format, but the same types of information must be included. Applications must employ a 2005 cost-year basis for all calculations *{Only the summary information or any graphic representing the overall cost contributions by unit operations, capital and debt costs will count against the page limit. The supporting calculations, data, figures and tables should be put in an appendix and will not count as part of the page limit}*.

**4. Emissions and energy costs** - Include an estimate of emissions and energy costs to produce the products. An energy and environmental life cycle analysis of the process from the delivery of the feedstock at the plant gate to final products or other approaches may be employed.

**5. Managing non-product streams** - Provide strategies for managing non-product or byproduct streams, since it is assumed no process has 100% conversion efficiency 100% of the time. Express in weight/weight product produced or weight/1,000,000 Btu of product produced.

*Rating Examples* - An application producing energy in the form of heat and power and a biofuel will be rated higher than one producing only heat and power. An application providing production of a biofuel and a chemical co-product but without showing the energy, economic or environmental benefit of producing the co-product will be rated lower.



**Feasibility:** The likelihood that the proposed demonstration can be accomplished within the proposed budget and the schedule by the team given their experience, past performance, past progress on the proposed technology, available financial and material resources, project plan, proposed budget and operational management (35%).

**Instructions:** In this section, an applicant should address:

1. **Project Plan** - Include a comprehensive Project Plan that will guide the design, engineering and construction of the commercial integrated biorefinery. As a minimum, the Project Plan must include:
  - a. Validated pilot plant data that forms the basis for this design.
  - b. Description of prior successful technical projects of this scale by the applicant or associated team members including an identification of vendors and partners involved.
  - c. Written descriptions of each step of the proposed process.
  - d. Full material and energy balances using industry standard software.
  - e. Plans to close and converge all recycle loops, both in a printout and in working versions of any simulations or plans.
  - f. Description of the selection process for an engineering, procure, and construct (EPC) firm, if used for the project.
  - g. Description of the capabilities of internal resources, if used for the project.
  - h. Equipment requirements.
  - i. A schedule or Project Work Plan. The schedule should include time periods for design, procurement, construction, and start-up and shake-down, as well as development of environmental and land-use agreements, obtaining permits and licenses, and obtaining financing. Budgets should be provided in the required documents (SF 424 forms as requested in Part IV.C).
  - j. Minimum design specifications in which process flow diagrams are coupled to preliminary cost estimates (internally or from an EPC contractor)
  - k. Planned project management tools, including Gantt charts, resource based scheduling, or other methods to assess progress and track progress. These would include methods to assess actual cost and schedule versus planned cost and schedule, etc.
  - l. Plans for staffing, including identification of costs and resources required to design, engineer and construct the proposed facility. This could involve proposals from third party operators.
  - m. Justification for the schedule for completing the proposed integrated biorefinery based on the applicant's professional evaluation or that of their EPC firms, if such are employed.
  - n. Contingency planning to address cost overruns and schedule slippage

**Note:** Federal matching funds will be allocated for up to 10% of the total cost for preliminary engineering and permitting. Federal funds for detailed engineering, procurement and construction will only be committed after the completion and

issuance of the appropriate permits. This evaluation will be conducted by DOE project management personnel as part of DOE's substantial involvement in the project. (See Part VI.B.2)

**2. Team qualifications** - Address the qualifications of the team undertaking the work, including a discussion of:

- a. Experience in designing, engineering and constructing similar sized operations
- b. Experience in operating biofuels or chemical processing facilities such that compliance with related environmental standards and regulations is maintained
- c. Experience in operating biofuels or chemical processing facilities such that compliance with related health and safety standards and regulations is maintained
- d. Experience in operating similarly sized operations including the ability to analyze data, to manage excursions from normal operations, and to troubleshoot problems. Expertise in design & build, scale-up/pilot testing, plant ownership and operation, permitting, feedstock acquisition, and raw material management. If biological processing is involved, experience of team members in fermentation processing and bioengineering. Evidence of commercial scale experience in all proposed key technology areas, including solids handling, solids separation, fermentation, chemical catalysis, purification of products, etc.
- e. Communication plans within the team and between the team and with outside entities, such as utilities, suppliers, fabricators, end-users, customers, DOE, etc.

**3. Estimating methods** - Explain the methods employed to estimate capital construction costs and future operating costs, such as:

- a. Bases and assumptions for all estimates, whether generated internally or by a third party
- b. Linkages between resources and work schedule
- c. Start-up, commissioning and operational plans that identify the data needed, staffing needs, reporting requirements and steps needed to optimize the design, engineer and construct of the facility.

**4. Operational management plan** - Provide an explanation of the operational management plan

- a. Plans for staffing, including identification of costs and resources required to operate the proposed facility. This could involve proposals from third party operators.
- b. Planned project management tools including Gantt charts, resource based scheduling, analytical tools or other methods to assess operation and measure production of outputs.
- c. Use of cost management tools

- d. Co-Products and Byproducts - Provide strategies for managing co-products or byproducts, since it is assumed no process has 100% conversion efficiency 100% of the time. Express in kg/kg product produced or kg/1,000,000 Btu of product produced.

## 5. Business and Market Plans

- a. Financial Assurances - Include project financing assurances describing the types of debt and equity used to finance the facility. Describe the instruments, debt and equity investments, contracts, agreements, etc. that are in place, or planned to be in place, to ensure the project will be funded through completion of start-up and shakedown and to operate profitably after initial construction costs are paid. Examples could include letters of intent, R&D investments to date by the team, ability to provide cost-share, evidence of track record for financing and implementing commercial scale projects, and cash-on-hand available to complete the project.
- b. Pro forma - Include a *pro forma* analysis of income and operating costs for at least 10 years past the completion of the construction of the facility and payment of initial construction *loans* {A *pro forma* should be attached as an appendix and *will not* count against the page limit}.
- c. Role of Department of Energy – Include an explanation of how the applicant envisions the cost-sharing from the Department of Energy will be used in the overall project financing structure.
- d. Outputs and Business Strategies - Include an explanation of how the production of the outputs (fuels, products, etc) is consistent with the strategic business plans of the company or members of the applicant team.
- e. Customers – Provide information on the customer(s) for the products being produced including commitments to purchase products produced. If the customer is internal to the company, provide documentation of need by the internal customer.
- f. Business Risks – Describe the Business risks associated with producing the planned product(s) including an estimate of changing market dynamics
- g. Legal and Regulatory – Discussion of how legal and regulatory issues will be managed.
- h. Liability insurance – Provide proof of such.

*Rating examples* - A comprehensive list of all major pieces of equipment with the sizes and materials of construction specified would rate higher than a simple list of equipment needs. Engineering simulations or plans that identify recycle loops but do not show how to close or converge such loops would be rated lower. Documentation on how an engineer, procure and construct (EPC) firm is selected and plans for using the EPC firm would rate higher than simply stating that an EPC firm as a subcontractor or partner will help in the execution of the project. Letters of intent from a financial institution or the company itself to fund the project through start-up and shakedown would rate higher than promises for funding.

**Criterion 2. The extent to which the application demonstrates that the proposed biorefinery project can be easily replicated based on the proposed deployment plan, including schedule for deployment and commercialization of additional operations.**  
(30%)

- A. Deployment Plan** - Include a deployment plan that provides explanations of the following that assumes successful operation of the proposed system:
1. Future market prospects for similar plants based on successfully achieving the goals and objectives of this first facility
  2. Description of future sites and feasibility of those sites to incorporate this new technology at existing operations or the feasibility of building new facilities. These are technical issues versus the other issues covered in A.4 below.
  3. Schedule for deployment and commercialization of additional operations based on successfully achieving the goals and objectives of this first facility
  4. Business, market and environmental risks for deploying additional operating facilities to other sites and the associated impact on the deployment schedule.

*Rating examples* – Biorefinery systems that can be employed across multiple regions of the United States and with a wide range of feedstocks are desirable but not required. An integrated biorefinery operation that can be deployed as multiple facilities across a wide geographic area would be considered more replicable than one that is restricted in the number and location of facilities, viz. multiple biorefinery operations that can only occur within a 100 mile radius would be considered less desirable than biorefinery operations that can be sited at multiple facilities across a wider geographic area.

An explanation containing specific and documented integration issues (via models or actual engineering designs) for implementing this operation at an existing facility would rate significantly higher than a statement that such integration is expected to be easily carried out. Statements that the technology is deployable to another physical geographic site without any supporting documentation would be rated low.

Table 2 - Units to be employed throughout the application

Value or Measure	Metric Units	English Units
Yields	kg or L/kg feedstock supplied	lb or gal/lb feedstock supplied
Process Conversion Yields	Percent of theoretical or potential yield	
Throughput volumes	L or kg/hr	Gallons or lbs/hr

<b>Value or Measure</b>	<b>Metric Units</b>	<b>English Units</b>
Product concentrations	kg or g/L	lb or lb/gal
Weight percentages	wt/wt	
Electricity	kW	
Heat	Joules	Btus
Energy use	kW/dry tonne product or kW/L product (at specific concentration, if applicable)	kW/dry ton product or kW/gal product (at a specific concentration, if applicable)
Overall plant biofuel capacity	L per annum	Gallons per annum
Overall plant product capacity (other than fuel, heat or power)	L or kg/dry tonne feedstock/annum	Gallons or lb/dry ton feedstock/annum
Overall plant capacity in heat or power	Million Btu/dry tonne of feedstock or kWh/dry tonne feedstock per annum	Million Btu/dry ton of feedstock or kWh/dry ton feedstock per annum
Emissions outputs	kg/kg product produced or kg/million Btu or gigajoule energy produced	lb/lb product produced or lb/million Btu or gigajoule of energy produced
Capital and equipment costs	Designate as purchased, installed or total investment (with indirect costs included). Employ a 2005 year cost basis.	
Life cycle assessment or analysis information	Reduction in fossil energy usage (see units above) or reduction in emissions from use of biomass (see units above)	

**Appendix D – EPA Act 2005 Sec. 932. BIOENERGY PROGRAM**

(a) DEFINITIONS.—In this section:

(1) BIOMASS.—The term “biomass” means—

(A) any organic material grown for the purpose of being converted to energy;

(B) any organic byproduct of agriculture (including wastes from food production and processing) that can be converted into energy; or

(C) any waste material that can be converted to energy, is segregated from other waste materials, and is derived from—

(i) any of the following forest-related resources: mill residues, precommercial thinnings, slash, brush, or otherwise non-merchantable material; or

(ii) wood waste materials, including waste pallets, crates, dunnage, manufacturing and construction wood wastes (other than pressure-treated, chemically-treated, or painted wood wastes), and landscape or right-of-way tree trimmings, but not including municipal solid waste, gas derived from the biodegradation of municipal solid waste or paper that is commonly recycled.

(2) LIGNOCELLULOSIC FEEDSTOCK.—The term “lignocellulosic feedstock” means any portion of a plant or coproduct from conversion, including crops, trees, forest residues, and agricultural residues *not specifically grown for food*, [emphasis added] including from barley grain, grapeseed, rice bran, rice hulls, rice straw, soybean matter, and sugarcane bagasse.

(b) PROGRAM.—The Secretary shall conduct a program of research, development, demonstration, and commercial application for bioenergy, including—

(1) biopower energy systems;

(2) biofuels;

(3) bioproducts;

(4) integrated biorefineries that may produce biopower, biofuels, and bioproducts;

(5) cross-cutting research and development in feedstocks; and

(6) economic analysis

(c) BIOFUELS AND BIOPRODUCTS.—The goals of the biofuels and bioproducts programs shall be to develop, in partnership with industry and institutions of higher education—

(1) advanced biochemical and thermochemical conversion technologies capable of making fuels from lignocellulosic feedstocks that are price-competitive with gasoline or diesel in either internal combustion engines or fuel cell-powered vehicles;

(2) advanced biotechnology processes capable of making biofuels and bioproducts with emphasis on development of biorefinery technologies using enzyme-based processing systems;

(3) advanced biotechnology processes capable of increasing energy production from lignocellulosic feedstocks, with emphasis on reducing the dependence of industry on fossil fuels in manufacturing facilities; and

(4) other advanced processes that will enable the development of cost-effective bioproducts, including biofuels.

(d) INTEGRATED BIOREFINERY DEMONSTRATION PROJECTS—

(1) IN GENERAL.—The Secretary shall carry out a program to demonstrate the commercial application of integrated biorefineries. The Secretary shall ensure geographical distribution of biorefinery demonstrations under this subsection. The Secretary shall not provide more than \$100,000,000 under this subsection for any single biorefinery demonstration. In making awards under this subsection, the Secretary shall encourage—

(A) the demonstration of a wide variety of lignocellulosic feedstocks;

(B) the commercial application of biomass technologies for a variety of uses, including –

(i) Liquid transportation fuels;

(ii) High-value biobased chemicals

(iii) Substitutes for petroleum-based feedstocks and products; and

(iv) Energy in the form of electricity or useful heat; and

(C) the demonstration of the collection and treatment of a variety of biomass feedstocks.

(2) PROPOSALS.—Not later than 6 months after the date of enactment of this Act, the Secretary shall solicit proposals for demonstration of advanced biorefineries. The Secretary shall select only proposals that—

(A) demonstrate that the project will be able to operate profitably without direct Federal subsidy after initial construction costs are paid; and

(B) enable the biorefinery to be easily replicated.

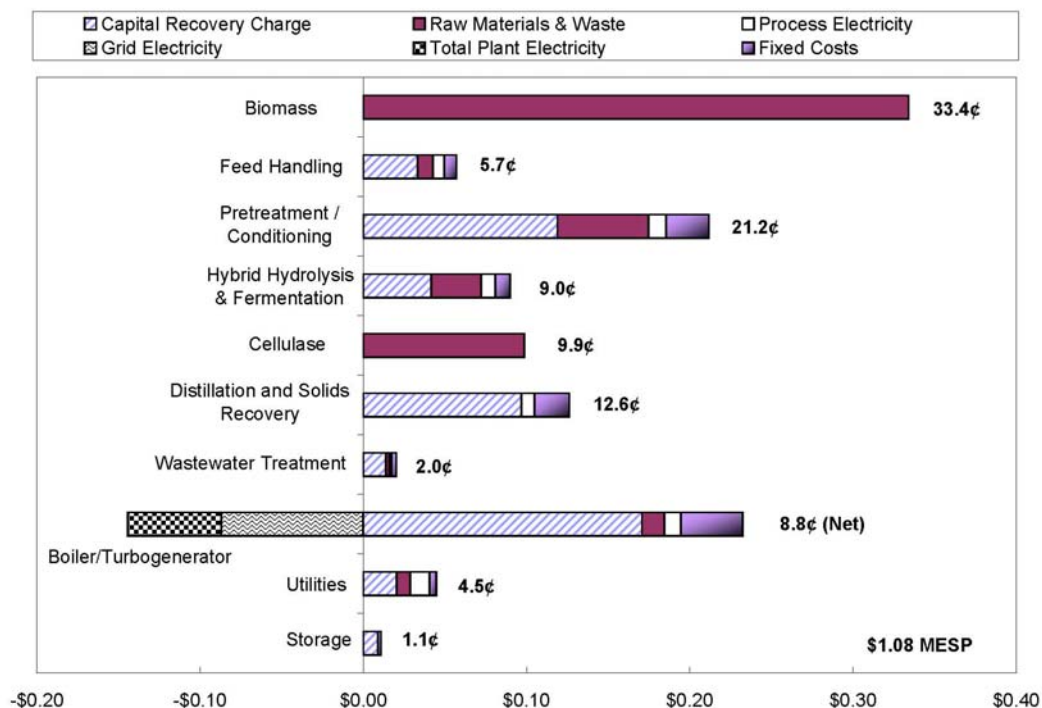
### Appendix E – Example of an Ethanol Production Process from Lignocellulosics

This example is based on the NREL base case model, Aden, A, et. al, 2002 - <http://www.nrel.gov/docs/fy02osti/32438.pdf> with some artificial inputs for demonstration purposes only. The first item is a summary table, the second is a graphic representation of costs by area, and the third is a high level summary of costs.

#### SUMMARY

ETHANOL COST OF PRODUCTION - Variable costs only	\$37,973,385/year	\$0.55 /gal
FIXED COST CONTRIBUTION	\$7,744,000/year	\$0.11 /gal
DEBT SERVICE (not a real value, an estimate)	\$4,675,004/year	\$0.07 /gal
MINIMUM ETHANOL SALES PRICE		\$0.73 /gal

Example of costs by area chart (MESP is minimum ethanol selling price)





**Cost Summary**

	COST PER UNIT	UNIT	ANNUAL PRODUCTION /CONSUMPTION	ANNUAL COST/REVENUE	COST PER GALLON
ANNUAL ETHANOL PRODUCTION		gallons	69,351,000.0		
Gallons per unit feedstock	\$89.81		Formatting of this cell.		

## VARIABLE COSTS

**Raw Materials:**

Feedstock	\$30.00	ton	772,162.5	\$23,164,874/year	\$0.33 /gal
Boiler Fuel -- Coal				\$0/year	\$0.00 /gal
Boiler Fuel -- Natural Gas				\$0/year	\$0.00 /gal
Boiler Fuel -- Biomass				\$0/year	\$0.00 /gal
Clarifier Polymer	\$1.26	lb	526,215.6	\$661,716/year	\$0.01 /gal
Caustic				\$0/year	\$0.00 /gal
Sulfuric Acid	\$0.01	lb	61,969,032.0	\$774,613/year	\$0.01 /gal
Hydrated Lime	\$0.04	lb	45,173,844.0	\$1,581,085/year	\$0.02 /gal
Anhydrous Ammonia				\$0/year	\$0.00 /gal
Corn Steep Liquor	\$0.08	lb	24,167,250.0	\$1,909,213/year	\$0.03 /gal
Purchased Enzymes	\$0.06	lb	126,476,676.0	\$7,209,171/year	\$0.10 /gal
Purchased Fermenting Organism				\$0/year	\$0.00 /gal
Urea				\$0/year	\$0.00 /gal
Diammonium Phosphate	\$0.07	lb	3,017,754.0	\$214,261/year	\$0.00 /gal
Propane	\$0.00	lb	378,270.0	\$870/year	\$0.00 /gal
Makeup Water	\$0.20	ton	1,797,013.7	\$359,403/year	\$0.01 /gal
Boiler Chemicals	\$1.69	lb	16,812.0	\$28,466/year	\$0.00 /gal
Cooling Tower Chemicals	\$1.05	lb	33,624.0	\$35,420/year	\$0.00 /gal
Wastewater Chemicals	\$0.16	lb	924,660.0	\$150,720/year	\$0.00 /gal
Wastewater Polymer	\$2.63	lb	3,110.2	\$8,191/year	\$0.00 /gal
Denaturant	\$0.10	lb	18,905,094.0	\$1,875,385/year	\$0.03 /gal
Royalties IP Fees				\$0/year	\$0.00 /gal
additional materials (list below)				\$0/year	\$0.00 /gal
				\$0/year	\$0.00 /gal
				\$0/year	\$0.00 /gal
				\$0/year	\$0.00 /gal

**Waste Stream Disposal costs:**

Ash from boiler	\$21.60	ton	40,374.0	\$872,079/year	\$0.01 /gal
Gypsum	\$21.60	ton	68,092.8	\$1,470,805/year	\$0.02 /gal
Waste water disposal				\$0/year	\$0.00 /gal
Additional Disposal costs (List)				\$0/year	\$0.00 /gal
				\$0/year	\$0.00 /gal
				\$0/year	\$0.00 /gal
				\$0/year	\$0.00 /gal

**TOTAL WASTE DISPOSAL COSTS****\$2,342,883/year \$0.03 /gal**

<b>Purchased Utilities (Credits as negative values)</b>				
Electricity	\$0.04	kWh	-144,120,870.0	-\$6,038,664/year (\$0.09)
Cooling Water				\$0/year \$0.00 /gal
Steam -- High Pressure				\$0/year \$0.00 /gal
Steam -- Low Pressure				\$0/year \$0.00 /gal
<b>Periodic Major Replacements</b>				
Baghouse bags	\$351,000.00	0.2	\$70,200/year	\$0.00 /gal
Ion exchange resin			\$0/year	\$0.00 /gal
Additional replacement costs (List)			\$0/year	\$0.00 /gal
			\$0/year	\$0.00 /gal
			\$0/year	\$0.00 /gal
<b>COST OF PRODUCTION</b>			#####	<b>\$0.55 /gal</b>
<b>FIXED COSTS</b>				
<b>General &amp; Administrative Fixed Costs</b>				
Salaries with fringe	\$2,274,000.00	1.0	\$2,274,000/year	\$0.03 /gal
Overhead	\$1,364,000.00	1.0	\$1,364,000/year	\$0.02 /gal
Maintenance	\$2,281,000.00	1.0	\$2,281,000/year	\$0.03 /gal
Insurance	\$1,825,000.00	1.0	\$1,825,000/year	\$0.03 /gal
Property Taxes			\$0/year	\$0.00 /gal
Warehouse fees			\$0/year	\$0.00 /gal
Additional fixed costs costs (List)			\$0/year	\$0.00 /gal
			\$0/year	\$0.00 /gal
			\$0/year	\$0.00 /gal
			\$0/year	\$0.00 /gal
			\$0/year	\$0.00 /gal
			\$0/year	\$0.00 /gal
<b>TOTAL FIXED COSTS</b>			<b>\$7,744,000/year</b>	<b>\$0.11 /gal</b>
<b>CAPEX</b>				
Total Plant Hard Cost			<b>\$114,049,000</b>	1.644518464
Other Costs unless included above				
Site Development			<b>\$5,915,000</b>	0.085290767
Field Expenses			<b>\$24,335,000</b>	0.350896166
Home Office & Construction Fee			<b>\$30,419,000</b>	0.438623812
Project Contingency			<b>\$3,650,000</b>	0.05263082
Permits			<b>\$18,008,000</b>	0.259664605
Start Up Costs			<b>\$0</b>	0
Other (list below)			<b>\$0</b>	0
Warehouse			<b>\$1,711,000</b>	0.024671598
			<b>\$0</b>	0
<b>TOTAL PLANT</b>			<b>\$198,087,000</b>	<b>\$2.86 /gallon</b>
<b>Financing</b>				
% Equity	100.000%	EQUITY	\$198,087,000	
Loan rate	4.900%			
Loan term (YEARS)	5	DEBT	\$7,500,000	

**Description**

2002 Design Report Target Case

**Feedstock Solids Analysis:**

Feedstock	Corn Stover
Feedstock Flow (dry tonne/day)	2000
<i>Solids Analysis:</i>	
Cellulose	37.4%
Xylan	21.1%
Arabinan	2.9%
Mannan	1.6%
Galactan	1.9%
Lignin	18.0%
Extractives	4.7%
Ash	5.2%
Acetate	2.9%
Protein	3.1%
Unknown Soluble Solids	1.1%
Total Solids	85.0%

**Pretreatment:**

Type	Continuous Dilute Sulfuric Acid
Acid Loading (kg acid/kg dry biomass)	0.025
Total Solids Concentration (g/g)	30%
Temperature (°C)	190
Pressure (atm)	12
Residence Time (min.)	2

*Yields:*

Cellulose to Glucolig	0.7%
Cellulose to Cellobiose	0.7%
Cellulose to Glucose	7.0%
Cellulose to HMF	0.0%
Xylan to Oligomer	2.5%
Xylan to Xylose	90.0%
Xylan to Furfural	5.0%
Xylan to Tar	0.0%
Mannan to Oligomer	2.5%
Mannan to Mannose	90.0%
Mannan to HMF	5.0%
Galactan to Oligomer	2.5%
Galactan to Galactose	90.0%
Galactan to HMF	5.0%
Arabinan to Oligomer	2.5%
Arabinan to Arabinose	90.0%
Arabinan to Furfural	5.0%
Arabinan to Tar	0.0%
Acetate to Oligomer	0.0%
Acetate to Acetic Acid	100.0%
Furfural to Tar	100.0%
HMF to Tar	100.0%
Lignin to Soluble Lignin	5.0%
Injection Steam #1 (kg/hr)	10,730
Injection Steam #2 (kg/hr)	37,154
Recycle Water to PT Reactor (kg/hr)	100,141

Reactor material of construction	316 SS
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**Conditioning**

Type of Conditioning	Overliming
Lime Addition (g/g hydrolysate)	0.33%
Conversion of Ca(OH) <sub>2</sub> to Gypsum	1
Sugar Losses	0.00%

**Solid/Liquid Separation**

Solids Washing	
Wash Water Temperature (°C)	57
S/L Separation Temperature (°C)	68
S/L Separation Pressure (atm)	1
Water/Hydrolyzate Ratio (kg/kg)	0.58
Water to S/L Separator (kg/hr)	135,591
Dilution Water (kg/hr)	63,113
Gypsum removed	5,635
Gypsum to process (kg/hr)	28

**Acetic Acid Removal**

None

**Enzyme Production**

Produced In-house or Purchased	Purchased
Purchase Price (\$/gal ethanol)	\$0.104
Purchase Price (\$/ton)	\$108.23
Price from metric (\$/gal ethanol)	\$0.137
Enzyme loading (FPU/g Cellulose)	12
Enzyme Concentration (FPU/mL)	50

**Saccharification & Fermentation**

Hydrolysis Residence Time (days)	1.5
Hydrolysis Temperature (°C)	65
Fermentation Residence Time (days)	1.5
Fermentation Temperature (°C)	41
Time percentage that chilled H2O is necessary	0.0%
Total Solids to Saccharification (wt%)	20.0%
CSL Loading	0.0025
DAP Loading (g/L)	0.33
<i>Saccharification Yields</i>	
Cellulose to Glucolig	4.0%
Cellulose to Cellobiose	1.2%
Cellulose to Glucose	90.0%
Glucolig to Cellobiose	0.0%
Glucolig to Glucose	0.0%
Cellobiose to Glucose	100.0%
<i>Fermentation Yields</i>	
Glucose to Ethanol	95.0%
Glucose to Zymo	2.0%
Glucose to Glycerol	0.4%
Glucose to Succinic Acid	0.6%
Glucose to Acetic Acid	1.5%
Glucose to Lactic Acid	0.2%
Xylose to Ethanol	85.0%
Xylose to Zymo	1.9%
Xylose to Glycerol	0.3%
Xylose to Xylitol	4.6%
Xylose to Succinic Acid	0.9%
Xylose to Acetic Acid	1.4%
Xylose to Lactic Acid	0.2%
Arabinose to Ethanol	85.0%
Arabinose to Zymo	1.9%
Arabinose to Glycerol	0.3%
Arabinose to Succinic Acid	1.5%
Arabinose to Acetic Acid	1.4%
Arabinose to Lactic Acid	0.2%
Galactose to Ethanol	85.0%
Galactose to Zymo	1.9%
Galactose to Glycerol	0.3%
Galactose to Succinic Acid	1.5%
Galactose to Acetic Acid	1.4%
Galactose to Lactic Acid	0.2%
Mannose to Ethanol	85.0%
Mannose to Zymo	1.9%
Mannose to Glycerol	0.3%
Mannose to Succinic Acid	1.5%
Mannose to Acetic Acid	1.4%
Mannose to Lactic Acid	0.2%
Contamination Loss	3.0%
 % of Theoretical Ethanol Yield	 79.7%
 Soluble Sugars From Pretreatment (kg/hr)	 27,686
Other Soluble Solids From Pretreatment (kg/hr)	10,551
Soluble Sugars in Purchased Cellulase (kg/hr)	0
Other Soluble Solids in Purchased Cellulase (kg/hr)	0
Soluble Sugars in Produced Cellulase (kg/hr)	0
Other Soluble Solids in Produced Cellulase (kg/hr)	0
 Soluble Sugars From Saccharification (kg/hr)	 51,869
Other Soluble Solids From Saccharification (kg/hr)	9,496
Soluble Sugars From Seed Train (kg/hr)	614
Other Soluble Solids From Seed Train (kg/hr)	1,159
Soluble Sugars From DAP (kg/hr)	0
Other Soluble Solids From DAP (kg/hr)	0
Soluble Sugars From CSL (kg/hr)	0
Other Soluble Solids From CSL (kg/hr)	542
Total Solids to Fermentation (wt%)	19.7%
 Fermenter Agitator Power (HP per 1000 gal)	 0.15
 Ethanol Concentration Out of Fermenters (wt%)	 6.2%

Calculation of Monthly Debt Service Payment

Loan Term Years	Interest Rate Monthly Int Rate (rate)	Monthly Payments (nper)	Loan Amount (pv)	Monthly Debt Service Payment	Loan Commitment Fee
5	4.900%	60	\$7,500,000	\$389,584	0.000%
	4.90%				\$0

ANNUAL DEBT SERVICE OUTLAY                      \$4,675,004.17